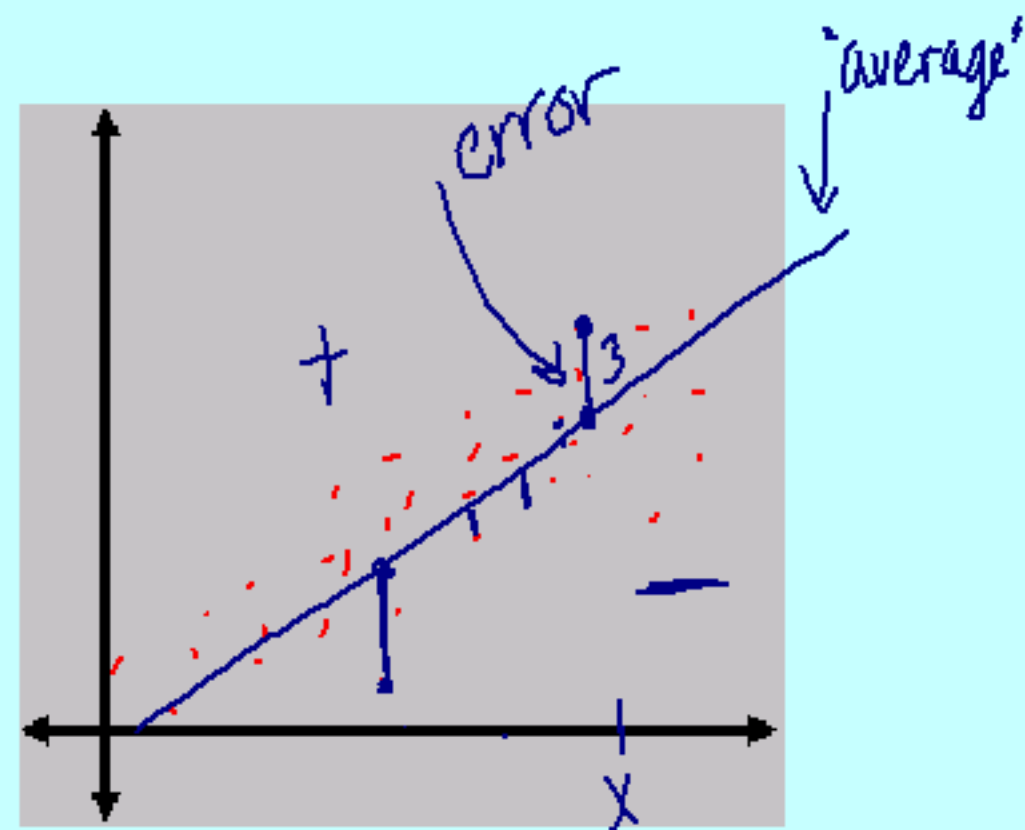


## Chapter 2 *section 3* Line of Best Fit

$$\text{errors} = \text{actual } y - \text{predicted } y$$

From line

$$\sum + \text{errors} = \sum - \text{errors}$$



### Linear Regression Line:

- **straight line**
- **Describes how...** a response variable (y) changes as an explanatory variable (x) changes
- ✱ **Used to ... predict the value of y for a given value of x**
- **Requires that... there is an explan. and resp. variable**

## Most accurate Regression line:

- Called: **Least Squares Regression line (LSR line)**

- Definition: minimizes... **the errors (in the y direction)**

Form:  $\hat{y} = a + bx$   ~~$y = mx + b$~~

Annotations:   
 -  $\hat{y}$  is labeled "sample"   
 -  $a$  is labeled "int."   
 -  $b$  is labeled "slope"   
 - The second equation  $y = mx + b$  is crossed out.

- Pieces:

AP Formula Sheet

$b = \text{slope} = r \left( \frac{s_y}{s_x} \right)$        $b_1 = r \left( \frac{s_y}{s_x} \right)$

$a = \text{int} = \bar{y} - b\bar{x}$        $b_0 = \bar{y} - b_1\bar{x}$

- always ... **passes thru  $(\bar{x}, \bar{y})$**

- not **resistant (the mean is in the formula)**

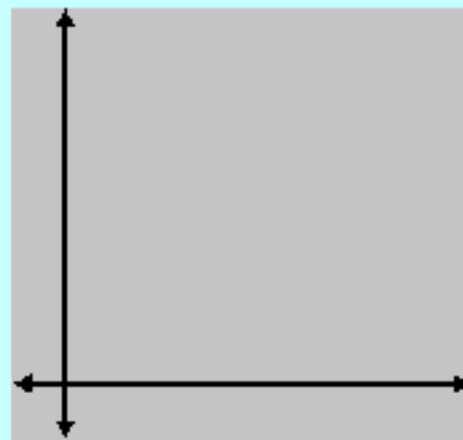
- on calculator: \* **STAT -> CALC -> 8:LinReg(a+bx) -> ENTER**  
\* **LinReg(a+bx) x-list, y-list, Y1**  
\* **Y1 is found at: VARS -> Y-VARS -> 1:Function -> 1:Y1 -> ENTER**

Corr

$$\left\{ \begin{array}{l} r = \\ s_y = \\ s_x = \\ \bar{x} = \\ \bar{y} = \end{array} \right.$$

**Vocab:**

**Extrapolation-**



#8

| Dist | 900 | 901 | 902 | 903 |
|------|-----|-----|-----|-----|
| Pred |     |     |     |     |

$y_1(900)$   
(901)

